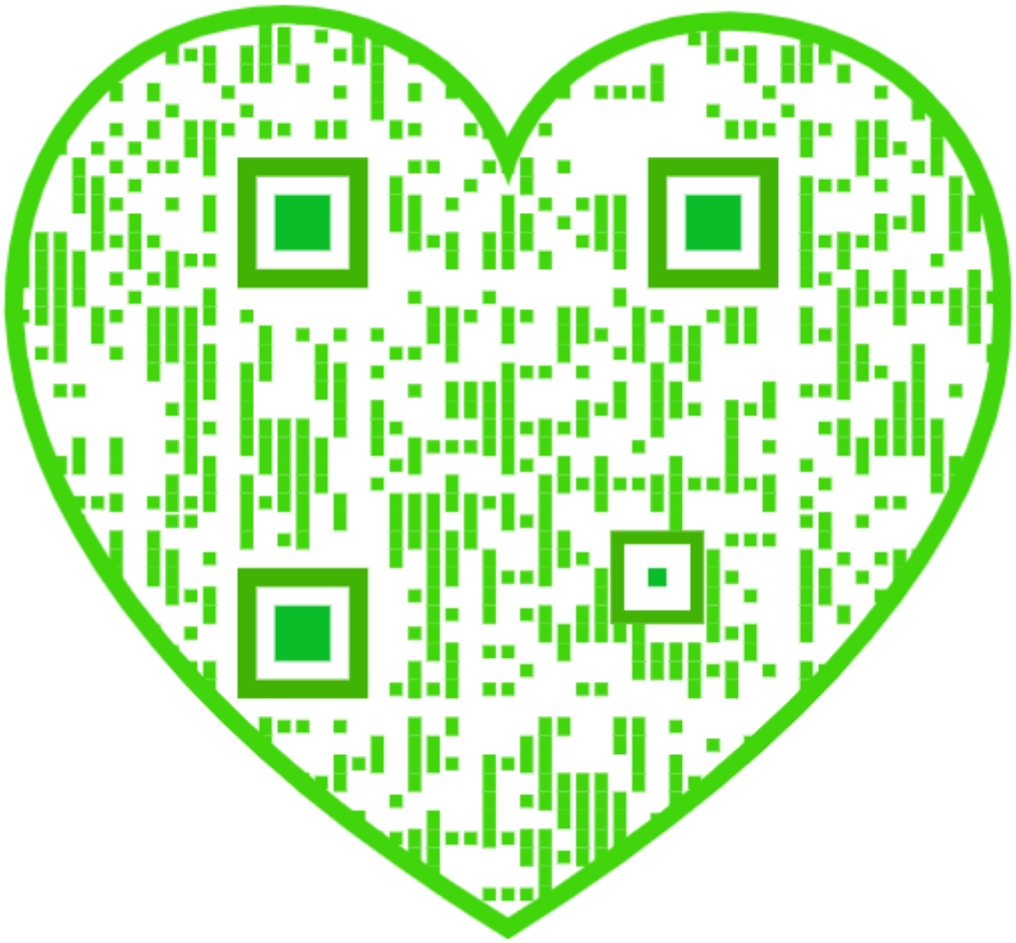

R. L. Weintraub

STUDENT'S HAND-BOOK

OF

MUSHROOMS OF AMERICA

EDIBLE AND POISONOUS.

BY

THOMAS TAYLOR, M. D.

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GASTEROMYCETES.

Hymenium more or less permanently concealed, consisting in most cases of closely packed cells of which the fertile ones (the basidia) bear naked spores on distinct spicules, exposed only by the rupture or decay of the investing coat or peridium. Berkeley's Outlines.

This family has been subjected to numerous revisions since the days of Fries, when its structural characteristics were not so well understood as at present.

Montagne and Berkeley are credited with being the first to show the true structure of the hymenium in the puff-balls, as well as to demonstrate the presence of basidia. This important discovery led to the correlating of the Gasteromycetes with the Hymenomycetes under the common title Basidiomycetes, both having the spores borne upon basidia. The two families still remained distinct, however, not only because of the dissimilarity in their external features but principally on account of the difference in the disposition and character of the hymenium.

In the Hymenomycetes the hymenium is exposed to the light from the first, and the spores drop from the basidia as they mature; whereas in the Gasteromycetes the hymenial pulp, or gleba, consisting of the spores with the supporting basidia and the hyphæ, is enclosed within the substance of the fungus, and the spores are exposed only on the decay of the investing coat.

The basidia of the Gasteromycetes, though resembling those of the Hymenomycetes, are more variable in form and the number of the spores not so constant. They perform the same functions and bear spicules, sometimes in pairs, sometimes quaternate, each spicule being surmounted by a spore. They dissolve away as the spores mature and can, therefore, only be observed in the very young stage of the plant. The spores of the Gasteromycetes are usually colored and, except in the subterranean species, globose. As seen through the microscope they have often a rough warty appearance, sometimes spinulose. Paraphyses may be present as aborted basidia, but cystidia are rarely distinguished. A characteristic of a large proportion of the plants is the drying up of the hymenial substance, so that the cavity of the receptacle becomes at length filled with a dusty mass composed of spores and delicate threads, the remains of the shriveled hyphæ.

The following table will serve to show the distinctive features of the four primary divisions of the GASTEROMYCETES:

Lycoperdaceæ.—Hymenium fugitive, drying in a dusty mass of threads and spores, dispersed by an opening or by fissures of the peridium Terrestrial.

Phalloideæ.—Hymenium deliquescent and slimy; receptacle pileate: volva universal. Fœtid fleshy fungi.

Hypogæi, or *Hymenogastreæ*.—Hymenium permanent, not becoming dusty or deliquescent except when decayed. Capillitium wanting. Subterranean.

Nidulariaceæ.—Receptacle cup-shaped or globose; spores produced on sporophores or short basidia enclosed in globose or disciform bodies (sporangia) contained within a distinct peridium. Terrestrial.

The section Lycoperdaceæ contains upwards of 500 species or more than two-thirds of the whole number of recorded species of the Gasteromycetes. Lycoperdon, Bovista, and Geaster, its most conspicuous genera, are said to contain the largest number of well-known species. A few are edible.

The Phalloideæ include about 90 species. The plants are usually ill-smelling and unwholesome. Some are stipitate, others are latticed, etc. Some are conspicuous for their bright coloring. In the young stage they are enclosed in an egg-shaped volva having a gelatinous inner stratum.

The plants of the Nidulariaceæ are very minute, tough, and widely distributed. The species Cyathus, the "bird's-nest fungus," is quite common in some localities, and is interesting because of its peculiar form. The individual plant is very small, not more than two centimeters high. It resembles an inverted bell, or a miniature wine-glass. A delicate white membrane covers the top at first. This disappears as the plant matures, revealing lentil-shaped bodies packed closely together like eggs in a nest. These oval bodies are the peridiola containing the spores. They are usually found upon rotton wood or sticks on the ground. Sixty-five species are recorded, but none are edible.

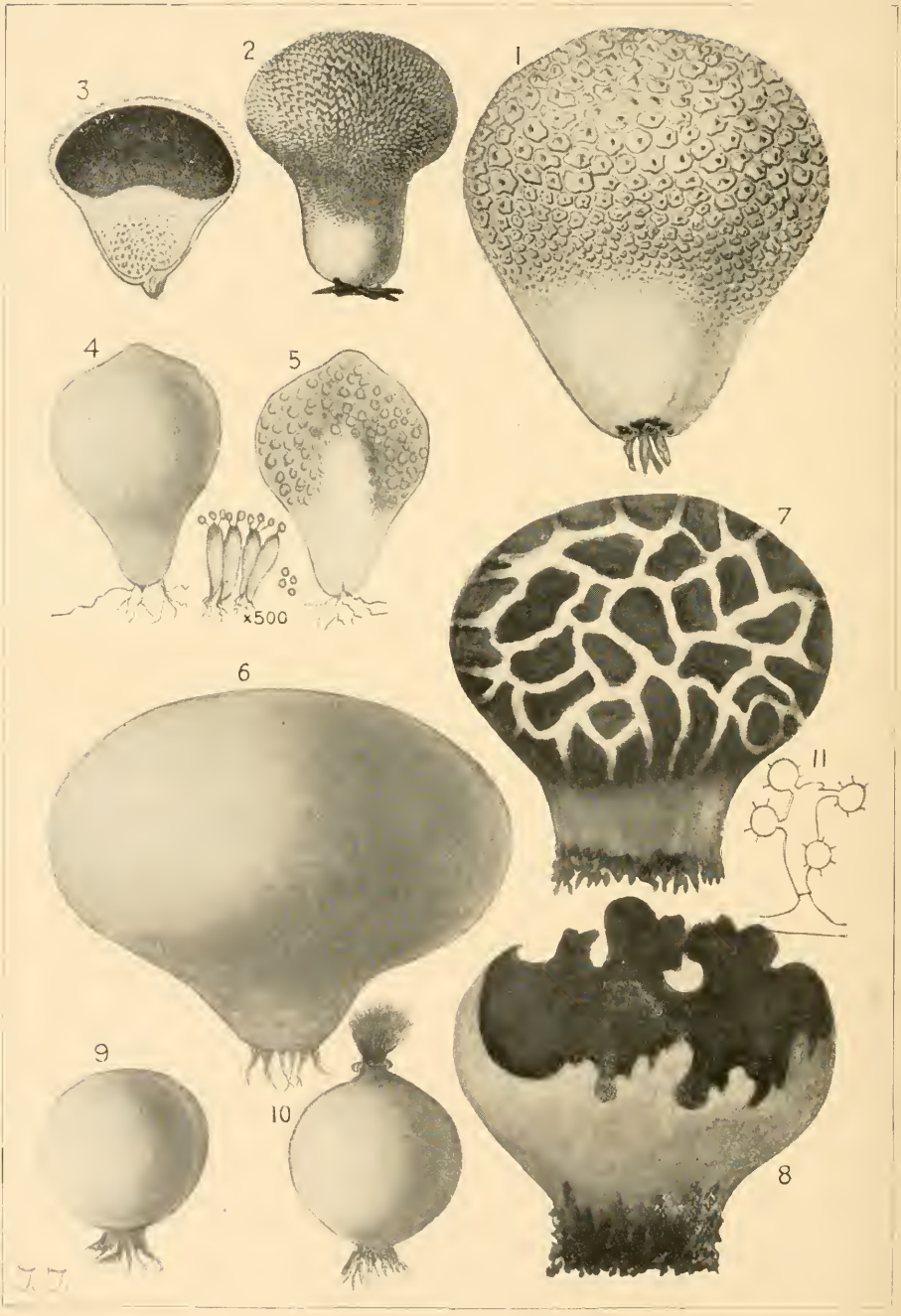
The plants of the division Hypogæi or Hymenogastreæ are subterranean in habit, preferring a sandy soil. They are usually somewhat globose in form, having a thick outer coat or peridium, though in some of the genera the outer coat is very thin or obsolete. They are dingy in color. In the young plants the interior substance somewhat resembles that of the truffle, but is streaked and mottled. When old the gleba consists of a dusty mass of threads and spores. They are known under various appellations, such as "underground puff-balls," "false truffles," etc.

The Hypogæi are analogous to the Tuberacei, except that the spores are not contained in asci as in the latter. Cooke says they appear to be the link which unites the Basidiomycetes to the Ascomycetes by means of the Tuberacei or genuine Truffles. In the young stage the basidia in the Hypogæi are easily distinguished by the aid of the microscope.

In external features and habit of growth the species of Elaphomyces, a genus of Tuberacei, closely resemble the Hypogæi, and in old age, when the *asci* have disappeared, it is difficult to distinguish the plants of this genus from the Hypogæi.

The genus *Melanogaster* contains an edible species, M. *variegatus*, Tulasne, commonly known in Europe as the "Red Truffle" or "False

Gasteromycetes.



Six Types of the "Puff Ball" Group.
Edible.

Truffle." M. *variegatus* is usually gregarious and subterranean in habit. The exterior is minutely granular, tawny yellow or reddish rust-color; the interior soft, bluish-black, streaked with yellow, the spore mass in maturity becoming pubescent. The odor is pleasantly aromatic, and the taste sweet. Under trees in woods. The variety *Broomeianus* Berk. is paler in the marbling, which shows reddish instead of yellow streaks. The pulpy mass is at first white, changing to a yellowish, smoky hue.

Lycoperdaceæ and Phalloideæ.

The plants figured in Plates G and H belong to the Lycoperdaceæ and Phalloideæ.

Lycoperdaceæ.

Massee, who has given the Puff-Ball group very close study, says that in the gleba of the Lycoperdaceæ, "at a very early period two sets of hyphæ are present. One, thin-walled, colorless, septate and rich in protoplasm, gives origin to the trama, and elements of the hymenium, and usually disappears entirely after the formation of the spores; the second type consists of long thick-walled aseptate or sparsely septate, often colored hyphæ, which are persistent and form the capillitium. The latter are branches of the hyphæ forming the hymenium."

Genera Lycoperdon and Bovista.

To the genera Lycoperdon and Bovista belong most of the "Puff-balls" and all of the species figured in Plate G. In the plants of these two genera the peridium is more or less distinctly double, and the hyphæ, or delicate threads which are seen mixed with the dusty mass of spores in the mature plant, forming what is called the capillitium, are an important element in classification.

Genus Lycoperdon Tourn. In this genus the investing coat or peridium is membranaceous, vanishing above or becoming flaccid; bark or outer shell adnate, sub-persistent, breaking up into scales or warts; capillitium soft, dense, and attached to the peridium, base spongy and sterile.

Plate G.

EDIBLE PUFF-BALLS.

Fig. 1.—Lycoperdon cælatum Fries. "*Collapsing Puff-Ball.*"

Peridium flaccid above, with mealy coating, obtuse, at length collapsing, the sterile stratum cellulose. Inner peridium distinct from the outer all round; capillitium nearly free, collapsing when mature, threads long and brittle; spores dingy olive, turning brown; base stem-like, broad and blunt, with root, obconical, somewhat spongy. Common in pastures and open woods. Edible when young, but not much commended. Plant pale cream color.

FIGS. 2 AND 3.—Lycoperdon gemmatum Batsch. "*Warted Puff-Ball*," "*Studded Puff-Ball.*"

Plant sub-globular, with a stem-like base; white or cinereous, turning to light greyish-brown, the surface warty, the warts unequal, the larger ones somewhat pointed, the smaller granular. As the warts fall off they leave the surface of the denuded peridium somewhat dotted or slightly reticulated. Flesh, when young, firm and whitish. The plants of this species are small, variable in form, sometimes turbinated, sometimes nearly globuse, or depressed globose, but usually the basal portion is narrower than the upper portion. The stem varies in thickness and length; sometimes it is quite elongated, in some instances absent. Capillitium and spores yellowish-green, turning dark olive or brown. Columella present. When the spores are fully ripe the peridium opens by a small apical aperture for their dispersion. The plants are sometimes densely cæspitose, and crowd together on the ground or on decaying wood in large patches after warm rains. They are found both in fields and open woods during summer and autumn. They are edible when young, but not specially well flavored. There are several varieties. Plants sometimes oval or lens-shaped.

In Var. *hirtum* the plant is turbinate, subsessile, and hairy, with slender, spinous warts. The variety *papulatum* is subrotund, sessile, papillose and pulverulent, the warts being nearly uniform in size. Plants from one to two inches in height.

FIGS. 4 AND 5.—Lycoperdon pyriforme Schaeffer. "*Pear-Shaped Puff-Ball.*"

Plant dingy white or brownish yellow; pear-shaped, or obovate pyriforme, sometimes approaching L. gemmatum in size and shape, but easily distinguished from that species by the surface features of the peridium and the internal hyphæ. The persistent warts which cover the surface of the peridium are so minute as to appear to the naked eye like scales. In some instances the peridium is almost smooth, and sometimes cracks in areas, inner peridium thin and tough. The hyphæ are thicker than the spores and branched, continuous with the slightly cellular base, and forming a columella inside the peridium. Spores greenish-yellow, then brownish-olive, smooth and globose.

The short stem-like base of the plant terminates in fiber-like rootlets, creeping under the soil and branching, thus attaching large clusters of the young plants together. They are often found in quantity on the mossy trunks of fallen trees.

FIG. 6.—Lycoperdon giganteum Batsch. "*Giant Puff-Ball.*"

The Giant Puff-Ball, so generally neglected, is one of the most valuable of the edible mushrooms. It is readily distinguished from other puff-balls and allied fungi by its large size. It is subglobose in form, often flat-

tened at the top and usually wider than deep. The peridium or rind is membranaceous, smooth, or very slightly floccose, and creamy white at first, turning to pale yellowish-brown when the plant is old. When young it is filled with a white, seemingly homogeneous fleshy substance of pleasant flavor. This substance changes, when mature, to an elastic, yellowish or olivaceous brown, cottony but dusty mass of filaments and spores. The peridium is very fragile above, cracking into areæ in the mature plant and breaking up and falling away in fragments, thus allowing the dispersion of the spores. The capillitium and spores are at first greenish-yellow, turning to dingy olive. The plants vary in size, but average from ten to twenty inches in diameter. In the columns of the *Country Gentleman* some years ago there appeared a description of a puff-ball of this species which weighed forty-seven pounds and measured a little over eight feet in circumference. It was found in a low, moist corner of a public park. Specimens weighing from twenty to thirty pounds are recorded as being found in different parts of the country; but specimens of such large dimensions are unusual. This species is found in many parts of the United States. It is the L. *bovista* of Linn. Sacc.

A correspondent writes that he has found the giant puff-ball in great abundance growing on the Genessee Flats, Livingstone Co., New York. Another writes from Nebraska that it is quite abundant on the prairies there in summer. A third writes from Missouri, "Since the late rains we have had puff-balls in abundance, and find them delicious made into fritters."

The puff-balls should be gathered young. If the substance within is white and pulpy, it is in good condition for cooking, but if marked with yellow stains it should be rejected.

Vittadini says:

"When the giant puff-ball is conveniently situated you should only take one slice at a time, cutting it horizontally and using great care not to disturb its growth, to prevent decay, and thus one may have a fritter every day for a week."

Different authors write with enthusiasm of the merits of the giant puff-ball as an esculent.

Mrs. Hussey, an English botanist, gives the following receipt for "puff-ball omelet:"

First, remove the outer skin; cut in slices half an inch thick; have ready some chopped herbs, pepper, and salt; dip the slices in the yolk of an egg, and sprinkle the herbs upon them; fry in fresh butter, and eat immediately.

I have tested fine specimens of the giant puff-ball gathered in the public parks of Washington, D. C., finding it delicious eating when fried in batter.

FIGS. 7. AND 8.—Lycoperdon cyathiforme Bosc. *"Cup-shaped Puff-Ball."*

Synonyms—L. fragile Vitt. L. albopurpureum Frost.

Plant nearly globose, with a short, thick, stem-like base, color varying, cinereous, brown, tinged with violet.

Rind or peridium smooth, or minutely floccose, scaly in the mature plant, cracking into somewhat angular areas, the upper portion finally falling away in fragments, leaving a wide cup-shaped base, with irregular margin, which remains long after the dispersion of the spores and capillitium. This basal portion is often tinged with the purplish hue of the spores. Spores rough, purplish-brown. Capillitium same color as the spores.

Lycoperdon *cyathiforme* is a more common species than L. *giganteum*, and is deemed quite equal to the latter in flavor. The plants are of good size, being from 4 to 10 inches in diameter.

They are frequently found in open fields and grassy places after electric storms. When sliced and fried in egg batter, they taste much like the *giganteum* or *giant puff-ball.*

A puff-ball which is not inferior to either of the two last-named species, though not as large, and perhaps not as abundant as either, is the Lycoperdon *saccatum* of Fries, sometimes called the "Long-stemmed puff-ball," because of its elongated stem.

The plants of this species are attractive in appearance, usually hemispherical, or lentiform in shape, with cylindrical stem-like base. The peridium is thin and delicate, breaking into fragments; creamy white in the young stage, and clothed with delicate warts, so minute as to give the surface a soft mealy appearance, the under surface somewhat plicate. Capillitium sub-persistent and dense. Both spores and capillitium brown.

LYCOPERDACEÆ.

Genus Bovista Dill. Peridium papery (or sometimes corky), persistent; the outer rind, sometimes called the bark, quite distinct from the inner, at length shelling off. Capillitium sub-compact, equal, adnate to the peridium on all sides; spores pedicillate, brownish.

FIGS. 9 AND 10.—Bovista plumbea Pers. *Lead-Colored Bovista.*

Plant small, spherical, having a double shell or peridium, the inner one white and the outer one smooth and greyish lead-color or bluish-grey, and shelling off at maturity. When young the interior is filled with a creamy white substance. This soon begins to disintegrate, and, as the spores mature, changes to a mass of dusty brown spores and threads. When the spores are ready for dissemination a small aperture appears in the top of the peridium, through which they push their way outwards like a little puff of smoke.

When young, and while the flesh is white throughout, the plant is edible, although so small that it would take a quantity to make a good

dish. It is found chiefly in pastures in the autumn. Sometimes found growing in company with Agaricus campestris. Of pleasant flavor when young.

Fig. 11. Basidium and spores of a Lycoperdon highly magnified.

An English author states that inflammation of the throat and swelling of the tongue have been known to ensue from eating some of the small species of Lycoperdon in the raw state. It would be a wise precaution, therefore, to cook all of the smaller species well before eating.

The genus Scleroderma is allied to Lycoperdon, but differs from it in the absence of a capillitium, and in the thick indehiscent outer skin, or peridium, which bursts irregularly on the maturity of the spore-mass, the flocci adhering on all sides to the peridium and forming distinct veins in the central mass.

The species Scleroderma *vulgare* is very common in woods, and has sometimes been mistaken for a form of Truffle. The plants are not very attractive, and the odor is rank. They are subsessile and irregular in shape, with a hard outer skin, the larger form of a yellowish or greenish brown hue, and covered with large warts or scales, the smaller very minutely warty, and of a darker brown hue. The internal mass is of a bluish-black hue, threaded through with white or greyish flocci. Spores dingy. The interior becomes pulverulent when the plant matures. This species has been eaten in its young state when cooked, but the flavor is by no means equal to that of the large puff-balls. It is sometimes attacked by a fungus larger than itself, called Boletus *parasiticus*, and this parasite is again attacked by a species of Hypomyces, one of the genera of the Pyrenomycetes, which grows in patches upon dead fungi.

Phalloideæ or Phallaceæ.

The Phalloideæ, sometimes called the "Stink-horn" fungi on account of their fetid odor, are not numerous, the whole number of described species being about eighty. The plants are watery, quick in growth, and decay very rapidly. They are varied in form and are quite unlike the ordinary mushroom types. In some of the genera the plants are columnar and phalloid, in other clathrate or latticed, in others again the disc is stellate, and in one genus it is coralloid, but they are all enclosed, in the early stage, in a volva which is at first hidden or partially hidden beneath the surface of the ground. A gelatinous stratum is contained within the firmer outside membrane.

Genus Ithyphallus. In this genus the cap is perforated at the top, free from the stem and reticulate. No veil. The mature plants are columnar in form with the remains of the volva enclosing the column-like stem at the base; the cap in its deeply pitted reticulations somewhat resembling that of the *Morel*, although of different texture.

Plate H.

Figs. 1 to 6.—Ithyphallus *impudicus* Linn. "*Fœtid Wood Witch.*"

In the embryonic stage the plant is enclosed in a volva which is composed of three layers, the outer one firm, the intermediate one gelatinous, and the inner one consisting of a thin membrane. The gleba, or spore-bearing portion, in the early stage forms a conical honeycombed cap within the inner shell or membrane, concealing the stem to which it is attached. The stem at this stage is very short, cylindrical, and composed of small cells filled with a gelatinous substance. The volva is about the size of a hen's egg. On maturity it ruptures at the apex. The stem rapidly expands and, elongating, elevates the cap into the air. The stem becomes open and spongy, owing to the drying of the gelatinous matter and its quick expansion.

The whole plant attains a height of from four to ten inches in a few hours. The hymenial surface is on the outside of the cap, the spores being embedded in its glutinous coated ridges and depressions. The hymenium is at first firm but rapidly deliquesces, holding the spores in the liquid mass. The cap is greenish or greenish-gray in color, changing to a dark bottle-green. In its deliquescent state the odor is very repulsive. While enclosed in the volva the unpleasant odor is not so perceptible, and it has been eaten in that condition without unpleasant effects, but in its mature stage it is considered unwholesome, and certainly its offensive odor would be quite sufficient to deter most persons from attempting to test its edible qualities. Flies, however, are very fond of the fluid, and consume it greedily and with impunity. It is found in gardens and woods, its presence being detected several rods away by the offensive odor. Specimens occur in which the color of the cap is white or reddish.

In the allied genus *Mutinus* the pileus is adnate and is not perforated at the apex. Mutinus *caninus* resembles *impudicus* in form, but the cap is continuous with, not free from the stem, and is crimson in color, covered with a greenish-brown, odorless mucus. The stem is hollow, whitish, tinted with a pale yellow or orange color. Not common.

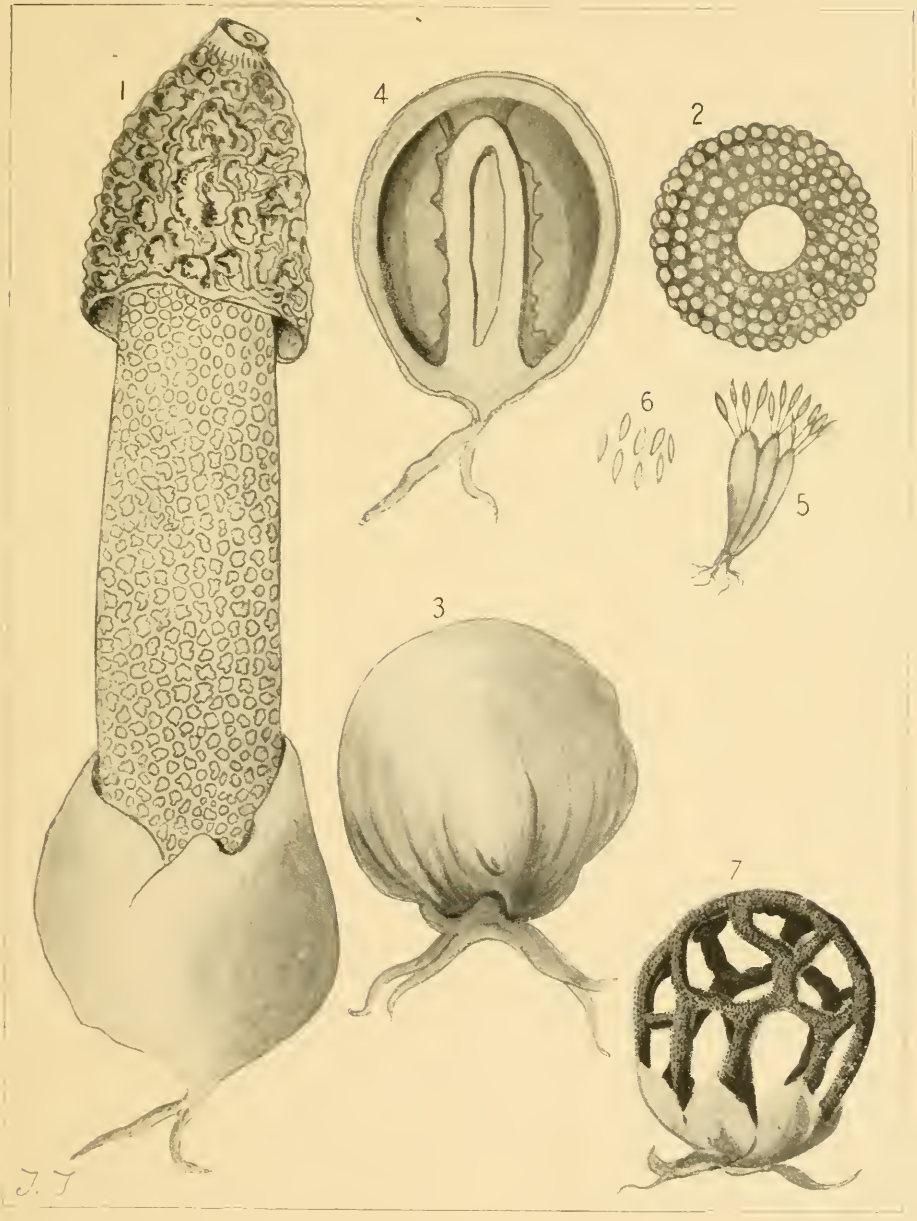
Genus Clathrus Mich. In this genus the receptacle is sessile, and formed of an obovate globular net-work. At first wholly enclosed in a volva which becomes torn at the apex and falls away, leaving a calyx-like base at its point of contact with the stem.

Fig. 7.—Clathrus cancellatus Tourn.

Unwholesome.

Receptacle bright vermillion or orange red, covered at first with a greenish mucus which holds the colorless spores. Volva white or pale fawn color. Odor strongly fœtid.

Gasteromycetes.



Phalloideae.

Figs. 1 to 6, Ithyphallus impudicus, Linn. "Fetid Mushroom."
Fig. 7, Clathrus cancellatus. Fr. "Latticed Mushroom."

Unwholesome.

MYXOMYCETES OR MYXOGASTERS.—"*Slime Fungi.*"

In their early history the Myxomycetes, or "slime moulds," were classed with the gasteromycetal fungi, and by Fries grouped as a sub-order of the Gasteromycetes, under the name Myxogasters. From this connection they were severed in 1833 by Link, who, recognizing certain distinctive features which entitled them to consideration as an entirely separate group, ranked the Myxogasters, as a separate order, under the title *Myxomycetes, Slime moulds.* De Bary, in a monograph on the subject written some years later, questioned the right of this group to the place assigned it in the vegetable world, claiming that the Myxogasters were as nearly related to the animal as to the vegetable kingdom, and changing the name to Mycetozoa. Massee assailed this position in his "Monograph of the Myxogasters," pointing out that De Bary derived his reasons and deductions from the early or vegetative stage of the fungi, without taking sufficiently into account the characteristics of the later or reproductive stage in which the great disparity between these organisms and those of the lower animals becomes apparent.

Dr. Rostafinski, the Polish botanist, and pupil of De Bary, adopts the name given the group by De Bary, but applies it in a more restricted sense, classifying on a botanical basis. Both De Bary and Massee have their earnest disciples. M. C. Cooke takes the ground that the Myxomycetes are entitled to mention as "*fungi* which produce their fructification enclosed within a peridium," although considering them as an aberrant group which, on account of certain peculiarities of their early or vegetative stage, should no longer be classed as having affinity with Gasteromycetes. Without further discussion of the subject, it is sufficient, for our present purpose, to state that mycologists now very generally agree in regarding this group as quite distinct from the Gasteromycetes.

The species are minute, rarely exceeding a millimeter in diameter, at first pulpy, then dry. In the early or vegetative stage the "slime mould" is plasmoidal, consisting of a mass of protoplasm without cell wall, and prefers damp surfaces, such as rotting leaves, moist logs, etc. The whole substance is slippery or slimy and presents different hues, red, orange, violet, brown, etc., according to species, but never green. It is in the reproductive or fruiting stage that their resemblance to microscopic puff-balls appears, the sporangium in many species exhibiting a distinct peridium or outer coat which encloses the spores together with the hair-like threads called the capillitium. On the ripening of the spores this peridium ruptures, allowing their escape, the capillitium lending valuable aid in their dissemination.

GENERA OF GASTEROMYCETES, ACCORDING TO SACCARDO.

I.—Phallaceæ, or Phalloideæ.

Dictyophora, Desvaugh.
Ithyphallus, Fr.
Mutinus, Fr.
Kalchbrennera, Berk.
Simblum, Klotzsch.
Clathrus, Mich.
Colus, Cav. & Sech.
Lysurus, Fr.
Anthurus, Kalchbr.
Calathiscus, Mont.
Aseroë, La Bill.
Staurophallus. (?)

II.—Nidulariaceæ.

Nidularia, Fr. & Nordh.
Cyathus, Hall.
Crucibulum, Tul.
Thelebolus, Tode.
Dacryobolus, Fr.
Sphærobolus, Tode.
Polyangium, Link. } Genera delenda.
Atractobolus, Tode. }

III.—Lycoperdaceæ.

Gyrophragmium, Mont.
Secotium, Kunze.
Polyplocium, Berk.
Cycloderma, Klotzsch.
Mesophellia, Berk.
Cauloglossum, Grev.
Podaxon (Desv.) Fr.
Sphæriceps, Welw. & Curr.
Tylostoma, Pers.
Queletia, Fr.
Battarrea, Pers.
Husseya, Berk.
Mitremyces, Nees.
Geaster, Mich.
Diplocystis, B. & C.
Diploderma, Link.
Trichaster, Czern.
Broomeja, Berk.
Coilomyces, B. & C.
Lanophila, Fr.
Eriosphæra, Reich.
Bovista, Dill.
Calvatia, Fr.
Lycoperdon, Tourn.
Hippoperdon, Mont.
Scleroderma, Pers.
Castoreum, C. & M.
Xylopodium, Mont.
Areolaria, Forquigu.
Phellorina, Berk.
Favillea, Fr.
Polygaster, Fr.
Polysaccum, D. C.
Testicularia, Klotzsch.
Arachnion, Schw.
Scoleciocarpus, Berk.
Paurocotylis, Berk.

IV.—Hymenogastraceæ (Hypogæi).

Hysterangium, Vitt.
Octaviania, Vitt.
Rhizopagon, Fr.
Melanogaster, Corda.
Hymenogaster, Vitt.
Hydnangium, Walk.
Gautieria, Vitt.
Macowanites, Kalchbr.

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AGARICINI.

Subgenus Lepiota Fries. Veil universal and concrete, with the cuticle of the pileus breaking up in the form of scales. Gills typically free, often remote, not sinuate or decurrent. Stem generally distinct from the hymenophore. Volva absent. Habitat terrestrial, mostly found on rich soil or in grassy places. (In Saccardo's *Sylloge*, Lepiota is given generic rank.)

The Lepiotas have a wide geographical distribution. No less than 225 species have been recorded as found in different parts of the world. These are pretty evenly divided between the torrid and temperate zones. They are generally smaller than the Amanitas, less fleshy and somewhat dry and tough. The flesh is soft and thready, not brittle. In the plants of most of the species the cap is rough, the cuticle being broken up into tufts or scales. These tufts are readily distinguished from the warts which characterize certain species of Amanita, being formed from the breaking up of the cuticle with the concrete veil, while the wart-like excrescences seen upon Amanita *muscaria*, for example, are composed of fragments of the volva, which is always found enclosing the very young plants of the genus Amanita.

A few of the species are characterized by a smooth cap; in some instances it is granulose or mealy. Usually the cuticle is dry, but in a few of the species it is viscid. The stem is generally long and hollow, and, being of different texture from the flesh of the cap, is easily separated from it, often leaving a distinct socket at the junction of stem and cap. It is sometimes smooth, sometimes floccose. In some species it is bulbous at the base, in others not. The ring which encircles the stem is at first continuous with the cuticle of the cap, breaking apart with its expansion. It is sometimes movable, sometimes evanescent.

The species generally are considered edible, or innoxious. None are recorded as dangerous. A mycophagist from Augusta, Ga., reports,

however, that the members of a family in that vicinity were made quite ill from eating the Lepiota *Morgani*, a greenish-spored species of Lepiota, while he himself ate of the same dish, experiencing no unpleasant effects. I have had no personal experience with this species.

Two edible species of Lepiota, which are widely commended as of good quality, and which are sufficiently abundant to have value as esculents, are figured in Plate XI. A third, Ag. (Lepiota) cepæstipes, var. cretaceus—Lepiota *cretacea*, figured in Plate XI½, is an exotic species found in greenhouses. It is of very delicate flavor.

Plate XI.

Figs. 1 to 4.—Ag. (Lepiota) procerus Scop. (Lepiota procera). "*Parasol Mushroom.*"

Edible.

Cap at first ovate, then expanded, showing distinct umbo, cuticle thick, torn into evanescent scales; gills remote from the stem, free, white, or yellowish-white; stem long, slender, variegated with brownish scales, hollow or slightly stuffed, bulbous at the base, and bearing a well-defined thickish ring, which in the mature plant is movable. Spores white, elliptical. The color of the cap varies from a light tan or ochraceous yellow to a dark reddish-brown. The surface showing beneath the lacerated cuticle is of a lighter hue than the cuticle, and is silky and fibrillose, giving the cap a somewhat shaded or spotted appearance. The flesh is dry, soft and thready, white. Taste and odor pleasant.

Cap from 3 to 5 inches broad; stem from 5 to 10 inches high.

This species is commonly found in pastures and in open grassy places; sometimes in open woods near cultivated fields, usually solitary or in very small clusters. It is a favorite among mycophagists. Lepiota *racodes* closely resembles Lepiota *procera*, and by some botanists the two are regarded as forms of the same species. In L. *racodes* the pileus is at first globose, expanded, and finally depressed in the centre; the cuticle is thin and broken into persistent scales; the whole plant smaller than L. procera. Flesh slightly reddish when bruised. Edible. There is also a white variety (*puellaris*) with a floccose squamose cap.

Plate XI.

Figs. 5 to 9.—Ag. (Lepiota) naucinus Fries (Lepiota naucinoides Peck). "*Smooth White Lepiota.*"

Edible.

Cap at first sub-globose, then curved, the surface smooth and satiny when dry, creamy white; gills close and slightly rounded at the inner extremity towards the stem, free from the stem, white; stem white, smooth, hollow, and bulbous at the base; ring thick, distinct, movable,

EDIBLE

Figs 1 to 4 Agaricus (Lepiota) procerus. Fries (Lepiota procera) "*Parasol Mushroom*."
Figs 5 to 9 Lepiota naucinoides Peck, (Agaricus naucinus Fries) "*Smooth White Lepiota*."

white. The gills, soon after gathering, become suffused with a faint pinkish or fleshy tint. The spores are white, sub-elliptical. Specimens occur in which there is a slight granulation in the centre of the cap, but they are rare. The variety *squamosa* shows the surface of the cap, somewhat broken into thick scales.

L. *naucinoides* is a very clean and attractive looking mushroom, usually symmetrical in shape. It is a fleshier mushroom than L. *procera*, and is found in grassy places, in lawns, sometimes in gardens, or by roadsides, especially where the soil is rich. The specimens figured in Plate XI were gathered in a rose garden, growing in loamy soil. Specimens have been received from different States, some of them much larger than those here illustrated.

This mushroom is recorded by some authors as equal in flavor to the Parasol mushroom. When stewed with butter it makes a very appetizing dish.

There is a fatally poisonous mushroom to which it bears some resemblance, and which might be taken for it, viz., Amanita *verna*, or "Spring mushroom." It is therefore necessary, in order to guard against such a mistake, to give particular attention to the characteristics of these two mushrooms. They are both white throughout, and both have white spores and ringed stem. Amanita *verna*, however, carries a white volva or cup-shaped sheath at the base of the stem, and the gills do not show a pinkish or flesh-colored tinge at any stage. In Lepiota *naucinoides*, as in all the Lepiotas, the volva is wanting. Amanita *verna* is apt to be moist and clammy to the touch, and is tasteless. L. *naucinoides* is dry, and has a pleasant flavor. The first is found *wholly* in *woods ;* the second prefers pastures, open grassy places, and gardens, though sometimes found in light woods. I have never found an Amanita in a lawn, pasture, or garden.

An edible mushroom, Agaricus (Psalliota) *cretaceus*, found in pastures, bears a slight resemblance to L. *naucinoides*, when the color of the spores and gills are not taken into consideration. In the former the gills very quickly change from their early stage of rosy pink to a dark purplish-brown color, like that of the common mushroom. The spores are purplish-brown, while in L. *naucinoides* the pinkish hue which tinges the fading plant is very faint, and changes to a very light tan color with age. The spores being white, the gills retain their white color for a long time, never changing to dark brown.

L. *Americana* Pk. A. & S., L. *excoriata* Schaeff, and L. *rubrotincta* Pk. have been tested and are of good flavor.

L. *Americana* has a reddish or reddish-brown cap, umbonate, with close adpressed scales and white flesh. The gills are broad and free from the stem, sometimes anastomosing near it, white : stem white, hollow, tapering towards the cap, annulate. When dried the whole plant has a brownish-red hue. When cut or bruised it sometimes exudes a reddish juice. Miss Banning reports specimens found in Druid Hill Park, Balti-

more. I have gathered very beautiful specimens in Montgomery county, Md. This mushroom sometimes grows to a very large size.

L. *excoriata* has a pale fawn-colored cap, slightly umbonate, with thin cuticle, breaking into scales; gills remote, white: stem white, hollow, and short, nearly cylindrical. Odor faint, pleasant.

L. *rubrotincta* Pk. "*Red-tinted Agaric.*" Cap reddish or pinkish, broadly umbonate and clothed with adpressed scales: gills whitish, free, and close; stem nearly equal or slightly thickened at the base, with a well-developed persistent white or pinkish ring. Spores white, sub-elliptical.

L. *holosericeus* Fries has a fleshy white cap, soft, silky, and fibrillose, a solid bulbous stem, with persistent broad, reflexed ring, and free ventricose, white gills. Edible. It is found in gardens and cultivated places.

L. *acutesquamosa* Wein, found in greenhouses and soil in gardens, is a heavy but not very tall species. The cap is obtuse, and fleshy, at first floccose. As the cap expands it bristles with erect pointed tufts or scales. The gills are white or yellowish, lanceolate and simple, free from the stem. Stem bulbous, somewhat stuffed, rough or silky below the ring, and downy above. Ring persistent. Color of cap whitish or light brown, with darker scales.

L. *granulosus* Batsch. Cap thin, wrinkled or corrugated, granulose, mealy; gills white, *reaching the stem*, sometimes free. Plants very small and varying in color—pink, yellow, and white, according to variety.

L. *amiantha*. Plants very small, ochraceous in color, with yellow flesh and white gills *adnate* and crowded.

L. *cepæstipes* Sow. Cap thin, broad, sub-membranaceous, broadly umbonate, adorned with mealy evanescent scales, margin irregular; gills white, at length remote. Stem hollow and floccose, narrow at top, ventricose; ring evanescent. Generally found in hothouses. Cap 1 to 3 inches broad. Stem 3 to 6 inches high. Spores white.

L. *cristata* is a common species found on lawns and in fields where the grass is short. The plants are small, the cap from $\frac{1}{2}$ to $1\frac{1}{2}$ inches in width. Not very fleshy. The cuticle of the cap is at first continuous and smooth but soon breaks into reddish scales. The stem is fistulose, slender and equal; gills free. Odor and taste somewhat strong and unpleasant.

Plate XI½.

Ag. (Lepiota) cepæstipes, variety cretaceus Peck (Lepiota cretacea).

Edible.

This very delicate and beautiful agaric is found on tan and leaves in hothouses.

The specimens here delineated were gathered in one of the hothouses of the Agricultural Department and first described and figured in *Food Products*, No. 2, of the report of the Division of Microscopy. The plants

Agaricus (Lepiota) cepaestipes—var. cretaceus, Peck. (Lepiota cretacea.)
Edible.
From Nature.

are a pure white throughout, and both stem and pileus are covered with small chalk-white mealy tufts. Berkeley says, "this species is probably of exotic origin, as it never grows in the open air." It is also met with in the hothouses of Europe. Specimens have been received from contributors who gathered them in greenhouses in different localities. This species should not be confounded with the purplish-brown spored mushroom Agaricus (Psalliota) cretaceus, which has pink gills turning to dark brown and is allied to the common meadow mushroom.

Lepiota *cretacea* is a delicious mushroom when broiled, or cooked in a chafing dish, and served on hot buttered toast.. It has a pleasant taste when raw.

Lepiota *Morgani* Peck, the "*Green-Spored Lepiota*," is an exception to the general type of Lepiotas in the color of its gills and spores. It is western and southern in its range. This species is described by Peck in the Botanical Gazette of March, 1897, p. 137, as follows: "Pileus fleshy, soft, at first sub-globose, then expanded or depressed, white, the brownish or alutaceous cuticle breaking up into scales except on the disk; lamellæ close, lanceolate, remote, white, then green; stem firm, equal, or tapering upwards, sub-bulbous, smooth, webby-stuffed, whitish, tinged with brown, annulus rather large, movable; flesh both of the pileus and stem white, changing to reddish, and then to yellowish hue when cut or bruised; spores ovate, sub-elliptical, mostly uninucleate, .0004 to .0005 inches long, .0003 to .00032 broad, sordid green.

"Plant 6 to 8 inches high, pileus 5 to 9 inches broad, stem 6 to 12 lines thick. Open dry grassy places. Dayton, Ohio. A. P. Morgan."

AGARICINI.

Genus Cortinarius Fries. This genus is distinguished by a cob-web-like veil, dry persistent gills, which in the mature plants become discolored, and pulverulent with the rusty or ochraceous-colored spores. The veil is very delicate, resembling a spider's web. It is not concrete with the cuticle of the cap, but extends from its margin to the stem, in the young plants sometimes concealing the gills, but disappearing as the cap expands. Sometimes a few filaments are seen depending from the margin of the cap or encircling the stem.

In the young plants of this genus the gills vary very much in color. They are whitish, clay-color, violet, dark purple, blood-red, etc., according to species, but, as the plants mature, the gills become dusted with the rust-colored falling spores, and with age usually become a rusty ochraceous, or cinnamon color. The stem in some of the species is distinctly bulbous and in others equal, cylindrical, or tapering. In identifying the species it is necessary, in order to ascertain the true color of the gills, to examine the plants at different periods of growth.

The genus Cortinarius is a large one, and contains many beautiful species. It is mainly confined to temperate regions. Not a single

species has been recorded as found in Ceylon, the West Indies, or Africa, but one tropical species is found in Brazil. Nearly four hundred species have been described, and over three hundred and seventy of these belong to the United States and Europe. A few are found in the extreme southern or temperate portion of South America, and several are reported from a temperate elevation among the Himalayas. Sweden and Great Britain, with their temperate climates, claim a large proportion of the European species. Not many of the Cortinarii have been recorded as edible, and none as dangerous. The Rev. M. J. Berkeley records, however, a case of poisoning by one of the species, C. (Inoloma) *bolaris* Pers., which though not fatal was somewhat alarming, the symptoms being great oppression of the chest, profuse perspiration, and the enlargement for two days of the salivary glands of the patient. I have seen no other statements relating to the poisonous properties of this species, and the results alluded to may have been owing to some individual idiosyncrasy.

Berkeley, in his "Outlines," gives the following description of this mushroom: "Pileus fleshy, obsoletely umbonate, growing pale, variegated with *saffron-red*, *adpressed*, *innate* scales; stem stuffed, then hollow, nearly equal, squamose, of the same color as the cap; gills subdecurrent, crowded, watery, cinnamon color. Cap 1 to 2 inches broad. Stem 2 to 3 inches long." In beech woods in September and October.

The genus Cortinarius has been divided by some authors into the following six groups: (1) *Phlegmacium*, in which the cap is fleshy and viscid, the veil partial, and the stem firm and dry; (2) *Myxacium*, in which the veil is universal and glutinous, hence the cap and stem both viscid; cap thin and the gills adnate or decurrent; (3) *Inoloma*, in which the cap is fleshy, dry, and at first silky with innate fibrils; veil simple and stem slightly bulbous; (4) Dermocybe, in which the pileus is thinly fleshy, dry, and at first downy, becoming smooth; the veil single and fibrillose; flesh watery, colored when moist, stem equal or attenuated downwards; (5) Telamonia, in which the cap is moist, at first smooth or dotted with the superficial fragments of the veil, the stem ringed below, or peronately scaly from the remains of the universal veil; (6) Hydrocybe, in which the cap is thin and moist, not viscid, smooth, or covered with superficial white fibrils; stem rigid, not scaly, veil thin, occasionally collapsed in an irregular ring. These subdivisions have been designated as *tribes* by some botanists and *subgenera* by others, etc. To the divisions Inoloma and Phlegmacium, respectively, belong the two species illustrated in Plate XII.

Plate XII.

Figs. 1 to 4.—Cortinarius (Inoloma) violaceus Fr. "*Violet Cortinarius.*"

Edible.

Cap fleshy, at first convex, then nearly plane, dotted with hairy tufts or scales, margin at first involute, color purple or dark violet, flesh soft,

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EDIBLE

Figs 1 to 4 Cortinarius (Inoloma) violaceus, Linn. "*Violet Cortinarius.*"
Figs. 5 to 7 Cortinarius (Phlegmacium) coerulescens, Fries.

purplish; gills distant, broad, adnate, somewhat rounded near the stem, at first purplish violet, changing to an ochraceous or brownish cinnamon color as the plant matures; stem solid, somewhat bulbous at the base, purple; cortina or veil white or tinged with violet, sometimes bluish.

This is a handsome species, and though it is somewhat rare in many localities, its pretty and unusual coloring does not allow it to be easily overlooked. It is edible, and has a mushroomy taste when raw. Agaricus *nudus* Bull, a purple species with white spores, is sometimes confounded with it. There are other purple species of Cortinarius not so pleasant to the taste, which bear some resemblance to C. *violaceus*. The specimens figured in Plate XII were gathered near Dedham, Mass., on open ground on the border of a stretch of pine woods.

FIGS. 5 TO 7.—Cortinarius (Phlegmacium) cærulescens.

EDIBLE.

Cap fleshy, at first convex, then plane, surface even, viscid; color bluish or violet; gills adnexed and crowded, at first bluish, changing to violet or purplish hues; stem solid, short, and thick, with a broadly bulbous base, same color as the cap; veil filmy, single. In woods and on the borders of woods. This mushroom varies in color, the bluish or purplish tints being quite susceptible to atmospheric changes. When growing in the shade or well-sheltered places, it is much darker in hue than when exposed unsheltered to the bright sunlight. The specimen figured in Plate XII was gathered on low ground near a pine grove in Essex County, Mass.

Cortinarius (Phlegmacium) *purpurascens* Fr. bears a slight resemblance to *cærulescens*, but can be distinguished from it by the spotted or zoned character of the cap and the broadly emarginate gills.

Cortinarius *turmalis*, an edible autumnal species, having an ochraceous or brownish-yellow cap with emarginate or decurrent gills, the latter at first whitish, then reddish clay color, is found in abundance in some parts of Maryland. The gills are never tinged with purple or blue. The flesh is white. The plants are easily discovered by those familiar with their habitat, as they grow under pine needles in groups, forming small mounds extending over large spaces, and in these hiding places, in the autumnal months, they are free from insects and dust. I have collected a bushel of them in less than an hour in fresh condition in October. Some of the French authors do not class this species as edible. Gillet, in his Hymenomycetes of France, enumerates fifty-three edible species of Cortinarius, but places *turmalis* among the suspects. I find this mushroom not only edible, but very valuable, because of its abundance in the localities where found. It is often densely cæspitose. The plant, when mature, is from 3 to 5 inches high.

C. *sebaceus*, found also in pine woods, is recorded as edible. The plant

is tall, white-stemmed, with broad tan-colored, somewhat viscid cap; emarginate gills, clay color at first, at last cinnamon color; stem solid, stout, fibrillose, and equal.

Cortinarius *collinitus*, Smeared Cortinarius, and Cortinarius *cinnamomeus*, with its variety semi-sanguinea, have also been tested, and found edible. The first of these is somewhat common. The plants when fresh are covered with a glutinous substance, and this should be removed before cooking. Cap smooth under the glutinous coat, light brown or tawny yellow in color, flesh white; gills whitish or light gray when young, cinnamon-hued in the matured plant. Stem solid, nearly equal, cylindrical, yellowish, and somewhat scaly. C. *cinnamomeus* belongs to the division Dermocybe. The cap is thin at first, silky with innate fibrids, becoming smooth, and varies from light brown to a dark cinnamon color. The gills are yellowish, then cinnamon; stem downy or silky, yellow. The variety *semi-sanguinea* has the lamellæ red, almost as in the preceding species.

C. (Phlegmacium) *varius*, "Variable Cortinarius," edible, has a compact fleshy viscid, even cap, brownish in color, gills at first violet, changing to cinnamon, stout solid stem, white or whitish, adorned with adpressed flocci, flesh white.

Cortinarius (Telamonia) *armillatus* Fries is given in M. C. Cooke's list of edible Cortinarii. Cap fleshy but not thick, fibrillose and slightly scaly, bright bay color, thin uneven margin; stem solid, dingy, rufescent, showing irregular red zones or bands elongated and slightly bulbous at the base; gills distant, broad, pallid in color at first, changing to dark cinnamon. C. (Telamonia) *hæmatochelis* Bull. (edible), somewhat resembles the former in color and size, though not so bright a brown. Cap thin, silky-fibrillose; gills adnate, narrow and crowded, light cinnamon; stem long, solid, dingy, with a reddish zone.

C. (Hydrocybe) *castaneus* Bull., *Chestnut Cortinarius* (edible), is found in woods and gardens. The plants of this species are usually small. Cap at first campanulate, expanding, sometimes slightly umbonate in the centre, chestnut color; gills ventricose, crowded, purplish, changing to rust color; stem short, hollow or stuffed, cartilaginous, equal, pallid, reddish brown, or tinged with violet; veil white.

Subgenus Collybia Fries. Cap at first convex, then expanded, not depressed, with an involute margin; gills reaching the stem, but not decurrent, sometimes emarginate; stem hollow, with cartilaginous bark of a different substance from the hymenophore, but confluent with it; often swollen and splitting in the middle; spores white. The plants are usually found growing upon dead tree stumps; some grow upon the ground; a few are parasitic on other fungi or springing from *sclerotia*, small impacted masses of mycelium. The species are generally small and firm and of slow growth. A few are edible, some few have an unpleasant odor. On account of the cartilaginous stem and the dryness of their substance, some of the smaller species are apt to be taken for Marasmii. Note: Saccardo in his Sylloge gives Collybia generic rank.

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EDIBLE

Figs. 1 to 3 Agaricus (Collybia) fusipes, Bull. "*Spindle Foot Collybia*."
Figs. 4 to 6 Agaricus (Collybia) maculatus. A&S. "*Spotted White Collybia*."
Figs. 7 to 9 Agaricus (Collybia) velutipes Curt. "*Velvet Footed Collybia*."

Plate XIII.

Figs. 1 to 3.—Ag. (Collybia) fusipes Bull. "*Spindle-Foot Collybia.*"

Edible.

Cap fleshy, somewhat tough, convex, then plane, smooth, even or slightly cracked in places, umbo evanescent, reddish brown; gills adnexed, nearly free, broad, distant, at length separating near the stem, firm, white, changing to fawn color, or pale brown often spotted; stem long, stuffed, then hollow, externally cartilaginous, contorted, swollen in the middle, cracking in longitudinal slits, fusiform, tapering narrowly to a rooted base, reddish brown. On stumps in woods in the autumn. Cap 1 to 2 inches broad; stem 2 to 6 inches long. This species is densely cæspitose. It is very generally recorded among authors as edible, although the flesh is somewhat tough. It requires long and slow cooking. An English author recommends it for pickling. Only the caps should be used for this purpose.

Figs. 4 to 6.—Ag. (Collybia) maculatus A. & S. (Collybia maculata). "*Spotted White Collybia.*"

Cap fleshy and compact, convexo-plane, obtuse, smooth, even, margin thin, at first involute, turned inwards, white; stem long and stout, externally cartilaginous, ventricose, sometimes striate, tapering towards the base; gills free, or nearly so, narrow, crowded, somewhat linear, white, becoming spotted. Taste slightly acid. The whole plant is creamy white, becoming spotted and stained throughout with rusty-brown or foxy-red tints. The plants are usually large, long stemmed, and grow in irregular clusters on decayed tree stumps in woods. Specimens of a large size have been gathered in the fir woods near Mattapoisett, Massachusetts. Cap 3 to 5 inches broad; stem 3 to 6 inches long. The variety *immaculatus* differs from the typical form in not becoming spotted and in the broader gills, which are serrated.

Figs. 7 to 9.—Ag. (Collybia) velutipes Curt. "*Velvet-Footed Collybia.*"

Cap fleshy, thin, at first convex, then plane, obtuse, smooth, viscid, tawny or brownish yellow, turning dark; flesh yellowish and soft; gills slightly adnexed, pale yellow; stem tough, stuffed, externally cartilaginous, sometimes slender, but usually thick, covered with a brown velvety down, dark bay color. This is a very common species in some localities. It is densely cæspitose, growing in heavy clusters on old logs and tree trunks in parks, woods, and gardens. The plants are quite gelatinous when cooked. Group figured from illustration by M. C. Cooke.

Collybia *radicata* Rehl. is recorded as an edible species. The plants have a thin, slightly fleshy cap, slightly umbonate, wrinkled, and glutinous at maturity; distant, white, adnexed gills, and tall, slender, rigid

stem. The latter is often twisted and usually attenuated upwards, color pale brown. It has a long tapering root entering deeply into the soil. This species is solitary in habit, and is commonly found in grass, or near decayed stumps. Cap from 2 to 3 inches in diameter, stem 6 inches to 10 inches in length.

Collybia *esculenta* Jacq., a small species found in pine woods as well as in pastures in the spring, is recorded as edible by a number of authors. In this species the cap is nearly plane, obtuse, and smooth, brownish; gills adnate, whitish; stem very slender, fistulose, equal, tough, smooth, reddish clay color, deeply rooting.

APPENDIX.

As Chief of the Division of Microscopy, U. S. Department of Agriculture, the author prepared for the World's Columbian Exposition at Chicago a collection of models of edible and poisonous mushrooms, for which a medal and diploma were there awarded. The same collection, which now belongs to the Museum of the Department of Agriculture, was exhibited at the Atlanta Cotton Exposition in 1895, where a diploma was again awarded for it, and has since been exhibited at the exposition of 1897 in Nashville, Tenn. The models composing this collection, about one thousand in number, were made from actual specimens and colored to nature, the same species being generally represented by numerous specimens so as to illustrate the various stages in the life of the plant, habit of growth, etc.

The following is a list of the mushrooms represented in this collection, among which there are types of most of the genera in which species recorded as edible occur:

Amanita *Cæsarea* Schaeff. "Orange Amanita." Edible,

Amanita *rubescens* Pers. "The Blusher." "Reddish-Brown Amanita." Edible.

Amanita *strobiliformis* Vitt. "Fir-Cone" or "Pine-Cone Amanita." Edible.

Amanita *pantherinus* D. C. "Panther Mushroom." Poisonous.

Amanita *phalloides* Fr. "Poison Amanita." Poisonous.

Amanita *muscaria* Linn. "Fly Amanita." "False Orange." Poisonous.

Amanita *verna* Bull. "Spring Mushroom." "Vernal Amanita." Poisonous.

Amanitopsis *vaginata* Roze. "The *Grizette*." "Sheathed Amanitopsis." Edible.

Lepiota *procera* Scop. "Parasol Mushroom." "Tall Lepiota." Edible.

Lepiota *racodes* Vitt. "Ragged Lepiota." Edible.

Armillaria *mellea* Fr. "Honey Mushroom." Edible.

Tricholoma *terreum* Schaeff. "The Gray Cap." Edible.

Clitocybe *illudens* Schw. "Giant Clitocybe." Unwholesome.

Clitocybe *odora* Bull. "Odorous Clitocybe." Edible.

Clitocybe *laccata Scop.* Edible.

Collybia *fusipes* Bull. "Spindle-Foot Collybia." Edible.

Pleurotus *ostreatus* Jacq. "Oyster Mushroom." Edible.

Pleurotus *ulmarius* Jacq. "Elm Pleurotus." Edible.

Volvaria *bombycina* Schaeff. "Silky Volvaria." This species has been recorded by some authors as poisonous. Hays, after testing it, speaks well of it, and states that is eaten on the Continent.

Volvaria *speciosa* Fr. Not commended.

Pholiota *caperata* Pers. Edible.

Agaricus *campester*. "Field Mushroom." Edible.

Agaricus *arvensis* Schaeff. "Horse Mushroom." Edible.

Hypholoma *sublateritium*. "Brick Top." Edible.

Hypholoma *Candolliana*. Edible.

Coprinus *comatus* Fr. "Shaggy Mane Mushroom." Edible.

Coprinus *atramentarius*. "Inky Coprinus." Edible.

Cortinarius *turmalis* Fr. Edible.

Cortinarius *cærulescens* Fr. Edible.

Hygrophorus *conicus* Fr. Conical Mushroom. Has been recorded by a number of authors as poisonous. Some later writers speak of it as edible.

Hygrophorus *puniceus* Fr. "Purplish Hygrophorus." Edible.

Hygrophorus *ceraceus* Fr. "Waxen Hygrophorus." Edible.

Lactarius *deliciosus* Fr. "Delicious Lactarius." Edible.

Lactarius *volemus* Fr. "Orange-brown Lactarius." Edible.

Lactarius *torminosus* Fr. This mushroom is said to contain an acrid juice which acts seriously on the stomach and alimentary canal.

Lactarius *rufus* Fr. Intensely acrid.

Lactarius *vellereus* Fr. Extremely acrid.

Lactarius *piperatus*. "Fiery Milk Mushroom." Extremely acrid when raw. The Russians parboil it, throwing away the liquid, before preparing for pickling. A noted German chemist reports it "not very safe."

Russula *alutacea* Fr. Yellow-gilled Russula. Edible.

Russula *virescens* Fr. Edible.

Russula *cyanoxantha* Schaeff. "Variable Russula." Edible.

Russula *emetica* Fr. This mushroom is extremely acrid when raw; by some authors it is recorded as poisonous, by others as edible. Chemical analysis has shown that it contains a varying proportion of muscarin, as well as cholin, etc.

Cantharellus *cibarius* Fr. "The Chantarelle." Edible.

Marasmius *oreades* Bolt. "The Fairy Ring Mushroom." Edible.

Boletus *edulis* Bull. Edible.

Boletus *scaber* Fr. Edible.
Boletus *granulatus* Linn. Edible.
Boletus *brevipes* Pk. Edible.
Boletus *luteus* Linn. Edible.
Boletus *pachypus* Fr. Edible.
Boletus *Americanus* Pk. Edible.
Boletus *subtomentosus* Linn. Edible.
Boletus *castaneus* Bull. Edible.
Boletus *satanus* Lenz. "White-topped Boletus." Recorded as poisonous.
Boletus *luridus* Schaeff. "Red-pored Boletus." Recorded as poisonous.
Strobilomyces *strobilaceus* Bull. Edible.
Fistulina *hepatica* Fr. "Beef-steak Fungus." Edible.
Polyporus *sulfureus* Bull. Edible.
Hydnum *repandum* Linn. Edible.
Hydnum *erinaceum* Bull. Edible.
Sparassis *crispa* Wulf. Edible.
Clavaria *cinerea* Bull. Edible.
Clavaria *rugosa*. Edible.
Lycoperdon *gemmatum* Fr. Edible.
Lycoperdon *giganteum* Fr. "Giant Puff-Ball." Edible.
Lycoperdon *pyriforme* Schaeff. "Pear-shaped Puff-Ball." Edible.
Scleroderma *vulgare* Fr.
Morchella *esculenta* Pers. Edible.
Morchella *conica* Bull. Edible.
Hirneola *auricula Judæ* Bull. Edible.
Ithyphallus *impudicus* Linn. Unwholesome.
Clathrus *cancellatus* Linn. Unwholesome.

Note.—In addition to the above there were also represented a number of coriaceous or woody species which grow upon trees, old stumps, etc.